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INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for April, 1889, and is based upon reports of regular and voluntary observers of both countries.

On chart i the paths of the centres of thirteen areas of low pressure are shown; the average number traced for April, during the last sixteen years, being 10.4. This chart also exhibits the approximate paths of the centres of seven depressions traced over the north Atlantic Ocean; the limits of fog-belts west of the fortieth meridian, and the distribution of ice-belts and field ice during the month. The severest storms were reported along the middle Atlantic and North Carolina coasts during the 6th and 7th, when heavy gales and unusually high tides caused great loss and damage to shipping and property. Along the trans-Atlantic routes the weather was seasonable and storms of unusual violence were not reported. Over and near the banks of Newfoundland there was a marked deficiency of Arctic ice. The areas of high and low pressure are discussed under their respective headings.

Chart ii exhibits the distribution of mean atmospheric pressure and temperature for the month. The mean temperature averaged above the normal in all districts, except the Florida Peninsula and the Rio Grande Valley, where the month was somewhat cooler than the average April. The greatest departures above the normal temperature were noted in the north-central districts, and at stations in adjoining parts of British America they amounted to 10°. At a number of stations west of the eighty-fifth meridian the highest absolute maximum

temperature noted for April during the periods of observation was reported.

The distribution of precipitation for April, 1889, is shown on chart iii, and the normal precipitation for eighteen years is exhibited on chart iv. The month was remarkable for the great excess of rainfall in the lower Rio Grande valley; the heavy precipitation in the middle Atlantic states, and the marked deficiency of rainfall on the south Pacific coast. The current and normal precipitation for the month are discussed under "Precipitation."

Chart v exhibits the depth of snow on the ground at the close of the month, and the limits of freezing weather during April, 1889.

In the preparation of this REVIEW data from 2,098 stations have been used, classified as follows: 175 Signal Service stations; 119 monthly registers from United States Army post surgeons; 1,243 monthly registers from state weather service and voluntary observers; 24 Canadian stations; 177 stations through the Central Pacific Railway Company; 360 marine reports through the co-operation of the Hydrographic Office, United States Navy; marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for April, 1889, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart ii by isobars. The difference between the mean pressure for April obtained from observations taken twice daily at the hours named and that determined from hourly observations varies at the stations named below, as follows: At Washington, D. C., Philadelphia, Pa., New York, N. Y., Boston, Mass., and Chicago, Ill., the mean of the 8 a. m. and 8 p. m. observations was higher by .007, .010, .008, .009, and .004, respectively, while at Saint Louis, Mo., and San Francisco, Cal., the mean of the observations taken at these hours was .001 and about .016, respectively, lower than the true mean pressure.

The mean pressure for April, 1889, was highest along the Pacific coast between the thirty-fifth and forty-eighth parallels, and from the north-central portions of the country southward to the Gulf and Florida coasts, where the values rose above 30.00, the highest mean reading, 30.06, being reported at Eureka, Cal. The mean pressure was lowest over the southern plateau region, where it fell to 29.85 at Keeler, Cal., and 29.86 at Yuma, Ariz., and was generally below 30.00 over the Rocky Mountain regions, in the Saint Lawrence Valley and

Canadian Maritime Provinces, and in the Atlantic coast states north of the thirty-second parallel.

Compared with the pressure chart for March, 1889, an increase in pressure is shown east of the Mississippi River and the upper lakes, and along the Pacific coast. Over the entire central portion of the country from the Mississippi River to the Pacific coast districts there has been a decrease in mean pressure. The most marked increase in pressure has occurred along the coast of Nova Scotia, where the mean readings for April were .15 higher than in the preceding month. On the Pacific coast the increase amounted to .12 at Eureka, Cal., and Fort Canby, Wash. The greatest decrease in mean pressure was noted at stations in the Canadian Northwest Territories, where it amounted to more than .10. Over a greater portion of the Rocky Mountain districts and in the upper Missouri valley the decrease varied from .05 to .09. A general comparison with the pressure chart of the preceding month shows that while an area of high pressure occupied the upper Missouri and Red River of the North valleys in March, 1889, no well-defined area of high pressure appears on the chart for the current month; that a decided increase in pressure has occurred at stations in the Canadian Maritime Prov-